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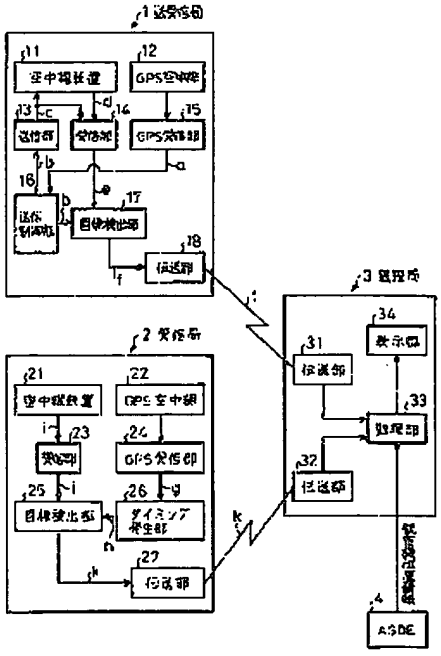
(71)出願人　000004237
日本電気株式会社
東京都港区芝五丁目７番１号

(72)発明者　中村　寿男
東京都港区芝五丁目７番１号　日本電気株式会社内

(74)代理人　弁理士　境　廣巳

(54)【発明の名称】　空港面航空機識別方式

(57)【要約】
【課題】　空港面に存在する航空機の位置及び識別番号を検出して表示する空港面航空機識別方式を提供する。
【解決手段】　滑走路の入口等に設定した監視エリアに向けて指向性を持つ空中線ビームを固定化した送受信局１から定期的にＳＳＲ質問信号を送信して航空機からのＳＳＲ応答信号を受信し、監視エリア内の航空機の位置及び識別番号を含むターゲットデータを処理局３に送出する。同様に監視エリアに向けて空中線ビームを固定化した受信局２でＳＳＲ応答信号を傍受して監視エリア内の航空機の位置及び識別番号を含むターゲットデータを処理局３に送出する。処理局３では、これらのターゲットデータから航空機の位置を更に精度よく決定し、この決定した位置とＡＳＤＥ（空港面探知レーダ装置）４で検出された航空機の位置との相関処理を行い、ＡＳＤＥ４で検出された位置の航空機に対して識別番号を付与して表示部34に表示する。



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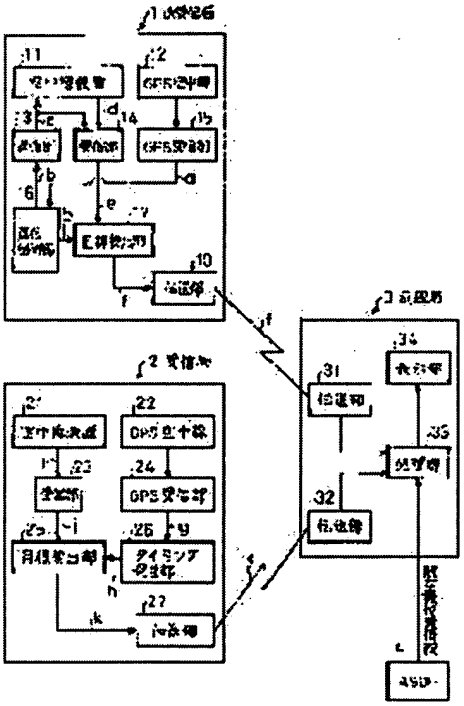
(71)Applicant : NEC CORP

(72)Inventor : NAKAMURA TOSHIO

(54) METHOD FOR IDENTIFYING AIRPLANE AT AIRPORT SURFACE



(57)Abstract:

PROBLEM TO BE SOLVED: To provide a method for detecting and displaying a position and an identification number of an airplane present on an airport surface, thereby identifying the airplane.

SOLUTION: SSR(secondary surveillance radar) inquiry signals are regularly transmitted from a transmitting-receiving station 1 which fixes directive aerial beams to a monitoring area set at an entrance of a runway or the like. SSR response signals from an air plane are received. Target data including a position and an identification number of the airplane in the monitoring area are sent to a processing station 3. Similarly, SSR response signals are picked up at a receiving station 2 which fixes aerial beams to the monitoring area, and target data including the position and identification number of the airplane in the monitoring area are sent to the processing station 3. At the station 3, the position of the airplane is accurately determined from the target data. The determined position is correlated to a position of the airplane detected by an ASDE(airport surface detection equipment) 4. An identification number is assigned to the airplane at the position detected by the ASDE 4, which is displayed at a display part 34.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention detects automatically the identification number of the aircraft which ran airport sides, such as a TWY, or has stopped there, and relates to the airport side aircraft discernment method displayed with the location.

[0002]

[Description of the Prior Art] The location of the aircraft on an airport side required for aircraft control is an airport side detection radar installation (Airport Surface Detection Equipment.). It can check by displaying the sight of an airplane on a display (radar scope) hereafter according to the aircraft positional information from calling ASDE. However, in ASDE, since the identification number of the aircraft in which it is shown which facilities of which company the aircraft is is undetectable, conventionally, automatic detection of the identification number of the aircraft is carried out, and the system which detects the location and identification number of the aircraft automatically is variously proposed combining ASDE.

[0003] For example, by combining with JP,3-220486,A the precision approach radar equipment and ASDE which are used for the ground control landing of the aircraft which advances into an airport the technique (the 1st conventional technique is called hereafter) which gives an identification number to the aircraft of the location detected by ASDE -- moreover, to JP,3-245082,A By combining the radar installation and ASDE which are used for the monitor of an airport circumference air area, the technique (the 2nd conventional technique is called hereafter) which gives an identification number to the aircraft of the location detected by ASDE is proposed, respectively.

[0004] Furthermore, by the data link function of the time of the pilot wave of the aircraft on an

airport side telephoning to a controller by the electric wave, or the aircraft, when aircraft information is transmitted by the electric wave to JP,6-342061,A The direction finder which detects the location of the radio source, and a means to acquire the identification number of the aircraft from the contents of a communication link by speech recognition etc., by combining with ASDE The technique (the 3rd conventional technique is called hereafter) which gives an identification number to the aircraft of the location detected by ASDE is proposed.

[0005] on the other hand, to "ICAO JOURNAL MAY 1994" The SSR (SecondarySurveillance Radar) sensor which consists of two transceiver stations to which the land-cover was made to reduce extremely, and one receiving station is arranged along a RWY or a TWY. While acquiring the identification number of the aircraft with the reply signal from the aircraft on the airport side over the question signal emitted from a transceiver station, the location of the aircraft is computed by trigonometry. The LIVE (the Locating and Identifying Vehicle Equipment) system which displays the location and identification number of the aircraft on a display is indicated. In order to arrange this LIVE system partially and to save costs, the technique (the 4th conventional technique is called hereafter) combined with ASDE is also proposed.

[0006]

[Problem(s) to be Solved by the Invention] Thus, also in the former, although not only the location of the aircraft which exists in an airport side combining ASDE but its identification number was going to show various equipment thru/or systems, there was a trouble which is described below.

[0007] Although the location and identification number can be matched with the 1st conventional technique and the 2nd conventional technique about the aircraft which arrived at the airport since he is trying to obtain the identification number of the aircraft using the radar installation used for the monitor of the precision approach radar equipment used for the ground control landing of the aircraft which advances into an airport, or an airport circumference air area, in the case of the aircraft which is going to take off from now on, the identification number is automatically unacquirable. For this reason, it is inadequate for the monitor of all the aircrafts that exist in an airport side.

[0008] Moreover, according to the 3rd conventional technique, not only the aircraft that arrived at the airport but the identification number of the aircraft which is going to take off from now on is acquirable. However, with the 3rd conventional technique, by the pilot wave of the aircraft

telephoning to a controller by the electric wave, by the data link function of the aircraft, since it becomes a major premise to transmit aircraft information by the electric wave, when such an action is not performed, it becomes undetectable [the identification number of the aircraft].

[0009] On the other hand, since according to the 4th conventional technique using a SSR sensor not only the aircraft that arrived at the airport but the identification number of the aircraft which is going to take off from now on is acquirable, a question signal is taken out periodically and a reply signal is further returned from the aircraft from SSR automatically to it, there is no trouble of leakage in detection like the 3rd conventional technique.

[0010] However, with the 4th conventional technique, in order to acquire the location and identification number of the aircraft by the SSR sensor which consists of two transceiver stations and one receiving station, there is a trouble that cost increases.

[0011] Then, the purpose of this invention is to offer the airport side aircraft discernment method which autonomous detection is possible even if it can acquire not only the aircraft that arrived at the airport but the identification number of the aircraft which is going to take off from now on and there is no message by the electric wave from the aircraft etc., and starts so much also neither as for ** nor cost.

[0012]

[Means for Solving the Problem] In the airport side aircraft discernment method which this invention detects the location and identification number of the aircraft which exist in an airport side, and is displayed The beam of ASDE which detects the location of the aircraft which exists in an airport side, and the antenna unit which has directivity in an airport side towards the monitor area set up beforehand is fixed. The information about the location of the aircraft and its identification number are detected from the SSR reply signal which transmitted the SSR question signal periodically and was received on the predetermined time band according to the distance of the local station after this transmission, and monitor area. Correlation processing with the location which the information about the location of the aircraft contained in the Target date outputted from the transceiver station which outputs the Target date containing them, and this transceiver station shows, and the location of the aircraft detected by said ASDE is performed. It is characterized by having the processing station which gives the identification number in said Target date to the aircraft of the location detected by said ASDE, and is displayed on a display.

[0013] If it is in the airport side aircraft discernment method of such a configuration The

transceiver station by which the beam of the antenna unit which has directivity towards monitor area, such as an inlet port of a RWY or a TWY and an outlet, was fixed transmits a SSR question signal periodically. The identification number of the aircraft concerned contained in the information (for example, time amount by the time of day which received the SSR reply signal from the time of day which sent out the SSR question signal) and the SSR reply signal about a location of the aircraft from the SSR reply signal received on the predetermined time band according to the distance of the local station after the transmission, and monitor area It detects and the Target date containing them is sent out to a processing station. Here, since a SSR reply signal is returned from each aircraft when two or more aircrafts are located in a line with the beam direction of an antenna unit, the SSR reply signal received after transmission of a SSR question signal on the predetermined time band according to the distance of a local station and monitor area is used for choosing the SSR reply signal from the aircraft which exists in monitor area. On the other hand, the location of the aircraft by which an ASDE exists in an airport side has detected, and correlation processing with the location which the information about the location of the aircraft contained in the Target date shows, and the location of the aircraft detected by ASDE performs, the identification number in a Target date gives to the aircraft of the location detected by ASDE, and it displays on a display in the processing station which received a Target date from a transceiver station. In addition, in a processing station, the location of the aircraft is pinpointed from the time amount by the time of day which received the SSR reply signal from the time of day which sent out the SSR question signal which is the information about the location of the aircraft contained in a Target date, and the beam direction of the antenna unit of a transceiver station.

[0014] Moreover, this invention is set to the airport side aircraft discernment method which displays the location and identification number of the aircraft which exist in an airport side. The beam of ASDE which detects the location of the aircraft which exists in an airport side, and the antenna unit which has directivity in an airport side towards the monitor area set up beforehand is fixed. The information about the location of the aircraft and its identification number are detected from the SSR reply signal which transmitted the SSR question signal periodically and was received on the predetermined time band according to the distance of the local station after this transmission, and monitor area. The beam of the transceiver station which outputs the Target date containing them, and the antenna unit which has directivity towards said monitor area is

fixed. The information about the location of the aircraft and its identification number are detected from the SSR reply signal received on the predetermined time band according to the distance of the local station after transmission of the SSR question signal of said transceiver station, and monitor area. The location of the aircraft is determined with a still more sufficient precision from the information about the location of the aircraft in the Target date containing the same identification number outputted from the receiving station which outputs the Target date containing them, and said transceiver station and said receiving station. It is characterized by having the processing station which performs correlation processing with the determined this location and the location of the aircraft detected by said ASDE, gives the identification number in said Target date to the aircraft of the location detected by said ASDE, and is displayed on a display.

[0015] If it is in the airport side aircraft discernment method of such a configuration The transceiver station by which the beam of the antenna unit which has directivity towards monitor area, such as an inlet port of a RWY or a TWY and an outlet, was fixed transmits a SSR question signal periodically. The identification number of the aircraft concerned contained in the information (for example, time amount by the time of day which received the SSR reply signal from the time of day which sent out the SSR question signal) and the SSR reply signal about a location of the aircraft from the SSR reply signal received on the predetermined time band according to the distance of the local station after the transmission, and monitor area It detects and the Target date containing them is sent out to a processing station. Moreover, the receiving station where the beam of the antenna unit which has directivity towards monitor area was fixed Information about the location of the SSR reply signal received on the predetermined time band according to the distance of the local station after transmission of the SSR question signal of said transceiver station, and monitor area to the aircraft (for example, a local station a SSR reply signal from the time of day when the transceiver station sent out the SSR question signal) The identification number of the aircraft concerned contained in the time amount and the SSR reply signal by time of day which were received is detected, and the Target date containing them is sent out to a processing station. Here, since a SSR reply signal is returned from each aircraft when two or more aircrafts are located in a line with the beam direction of an antenna unit, in a transceiver station and a receiving station, the SSR reply signal received after transmission of a SSR question signal on the predetermined time band according to the distance of a local station

and monitor area is used for choosing the SSR reply signal from the aircraft which exists in monitor area. On the other hand, have detected the location of the aircraft by which ASDE exists in an airport side, and it sets to the processing station which received the Target date from the transceiver station and the receiving station. The location of the aircraft is determined with a still more sufficient precision from the information about the location of the aircraft in these two Target dates. Correlation processing with this determined location and the location of the aircraft detected by ASDE is performed, the identification number in said Target date is given to the aircraft of the location detected by ASDE, and it displays on a display. In addition, the detection of the location of the aircraft based on the Target date in a processing station makes the location of the aircraft the intersection of the hyperbola decided by the time difference of the time amount by the time of day which received the SSR reply signal from the time of day which sent out the SSR question signal included in the Target date sent out for example, from the transceiver station, and the same time amount included in the Target date sent out from the receiving station, and the beam direction of the antenna unit of a transceiver station. Moreover, the intersection of the line of position decided by time amount from a transceiver office to the time of day which received the SSR reply signal from the time of day which sent out the SSR question signal included in the sent-out Target date, and the line of position decided by same time amount included in the Target date sent out from the receiving station can also be made into the location of the aircraft.

[0016]

[Embodiment of the Invention] Next, the example of the gestalt of operation of this invention is explained to a detail with reference to a drawing.

[0017] Reference of drawing 1 constitutes the airport side aircraft identification unit of one example of this invention from the transceiver office 1, a receiving station 2, a processing office 3, and ASDE4.

[0018] By transmitting a SSR question signal periodically towards the specific monitor area of an airport side, and receiving the SSR reply signal from the aircraft, the transceiver station 1 generates the Target date containing the information and the identification number about a location of the aircraft which exists in the monitor area concerned, and has the function which carries out processing station 3 HE sending out. Moreover, by monitoring the SSR reply signal from [said] monitor area, a receiving station 1 generates the Target date containing the

information and the identification number about a location of the aircraft which exists in the monitor area concerned, and has the function transmitted to the processing station 3. Furthermore, a processing office 3 determines the location of the aircraft with a still more sufficient precision from the information about the location of the aircraft in the Target date from the transceiver office 1 and a receiving station 2, performs correlation processing with this determined location and the location of the aircraft from ASDE4, and has the function which gives and displays the identification number in a Target date to the aircraft of the location detected by ASDE4. In addition, ASDE4 is a known airport side detection radar installation which detects the location of the aircraft which exists on an airport side.

[0019] The example of the beam direction of the antenna unit of the transceiver office 1 and a receiving station 2 is shown in drawing 2 . It is fixed to direction 1b respectively determined as beam 1a of the antenna unit of the transceiver station 1 which transmits a SSR question signal to the aircraft, and receives the SSR reply signal, and beam 2a of the antenna unit of a receiving station 2 which receives the SSR reply signal from the aircraft beforehand, and 2b as shown in this drawing. The direction is a direction which overlooks the monitor area E from the part in which the transceiver station 1 and the receiving station 2 were installed. That is, although an antenna unit with sharp directivity is rotated and a direction is detected 360 degrees in general SSR, in the case of this invention, an antenna unit is fixed, and the beam with directivity is being fixed in the direction of monitor area E. In this case, since there is diffusion of a beam, the area of the part which gave the slash of this drawing where beam 1a and beam 2a cross is different with the distance from each stations 1 and 2, but when distance is the same, the case where Beams 1a and 2a intersect perpendicularly becomes the smallest. Then, it is desirable to adjust the relation between the physical relationship of the transceiver station 1, a receiving station 2, and the monitor area E and a beam direction so that Beams 1a and 2a may intersect perpendicularly mostly.

[0020] Next, the example of a configuration and actuation of the transceiver office 1 of drawing 1 , a receiving station 2, and the processing office 3 are explained.

[0021] The transceiver office 1 consists of an antenna unit 11, the GPS aerial 12, the transmitting section 13, a receive section 14, the GPS receive section 15, the transmission-control section 16, a target detecting element 17, and a transmission part 18, as shown in drawing 1 . The GPS (Global Positioning System) aerial 12 and the GPS receive section 15 are parts which acquire a

highly precise reference signal from GPS, and the acquired reference signal a is transmitted to the transmission-control section 16. The transmission-control section 16 generates the system trigger b which has a certain repeat period from this reference signal a, and transmits it to the transmitting section 13 and the target detecting element 17. The transmitting section 13 transmits the SSR question signal c in Mode A (1030MHz) towards monitor area through an antenna unit 11 synchronizing with this system trigger b.

[0022] The transponder carried in the aircraft so that it might be well-known transmits the SSR reply signal d (1090MHz) which contains the identification number of a self-opportunity to the question signal c in Mode A. It is received by the antenna unit 11 and this transmitted SSR reply signal d is transmitted to a receive section 14, and a receive section 14 changes this SSR reply signal d into video signal e (60MHz) using the SSR question signal c, and transmits it to the target detecting element 17. The target detecting element 17 inputs and processes this video signal e and the system trigger b, generates Target date f containing the information (time amount by the time of day which received the SSR reply signal from the time of day which sent out the SSR question signal) about the location of the aircraft, and the identification number of the aircraft concerned contained in the SSR reply signal d, and transmits it to a transmission part 18. A transmission part 18 transmits this Target date f to the processing station 3 by wireless etc.

[0023] Here, actuation of the target detecting element 17 is explained further. As drawing 2 explained, the transceiver office 1 transmits a SSR question signal towards the monitor area E, and receives the SSR reply signal from the direction. As shown in drawing 3 , when two or more aircrafts are located in a line with the aerial beam direction for this reason, the transponder of that aircraft of each will return a SSR reply signal. So, in this invention, only the SSR reply signal from the aircraft in monitor area is chosen with a gate signal using the distance of the transceiver station 1 and monitor area having become settled beforehand. That is, as shown in the timing chart by the side of the transceiver office in drawing 4 , when a SSR question signal is sent out synchronizing with a system trigger and two or more SSR reply signals are received, one of two or more SSR reply signals is chosen using the gate signal (time window) set up according to the distance of a transceiver office and monitor area. And while using the identification number contained in this selected SSR reply signal, let a difference (transceiver time difference) with the receipt time of this selected SSR reply signal be the information about the location of the aircraft from the transmitting time of day of a SSR question signal.

[0024] Next, the example of a configuration and actuation of a receiving station 2 are explained. The receiving station 2 consists of an antenna unit 21, the GPS aerial 22, a receive section 23, the GPS receive section 24, a target detecting element 25, the timing generating section 26, and a transmission part 27, as shown in drawing 1 . The GPS aerial 22 and the GPS receive section 24 are parts which acquire a highly precise reference signal like the thing by the side of the transceiver station 1, and the acquired reference signal g is transmitted to the timing generating section 26. The timing generating section 26 generates the system trigger h which synchronized with the system trigger of the transceiver station 1 from this reference signal g, and transmits it to the target detecting element 25.

[0025] On the other hand, it is received by the antenna unit 21 and the SSR reply signal i from the aircraft to the SSR question signal c which the transceiver station 1 transmitted is transmitted to a receive section 23, and a receive section 23 changes this SSR reply signal i into video signal j using the signal (1030MHz) generated in person, and transmits it to the target detecting element 25. The target detecting element 25 inputs and processes this video signal j and the system trigger h, generates Target date k containing the information (time amount by the time of day when the local station received the SSR reply signal i from system trigger time of day (transmitting time of day of the SSR question signal c of the transceiver station 1)) and the identification number about a location of the aircraft, and transmits it to a transmission part 27. A transmission part 27 transmits this Target date k to the processing station 3 by wireless etc. As here shows the target detecting element 25 to the timing chart by the side of the receiving station in drawing 4 When two or more SSR reply signals are received, the gate signal set up according to the distance of a receiving station and monitor area is used. One of two or more SSR reply signals is chosen, and while using the identification number contained in this selected SSR reply signal, let time amount (transceiver time difference) from system trigger time of day to the receipt time of the SSR reply signal which made [above-mentioned] selection be the information about the location of the aircraft.

[0026] Next, the example of a configuration and actuation of the processing station 3 are explained. The processing office 3 consists of transmission parts 31 and 32, the processing section 33, and a display 34, as shown in drawing 1 . A transmission part 31 receives Target date f transmitted from the transceiver station 1, transmits it to the processing section 33, and a transmission part 32 receives Target date k transmitted from a receiving station 2, and it

transmits it to the processing section 33. Aircraft positional information is inputted into the processing section 33 from ASDE4 in addition to these data.

[0027] In the processing section 33, while recognizing the identification number of the aircraft which exists in monitor area based on Target dates f and k which received from the transceiver station 1 and the receiving station 2, it asks for the location of the aircraft. The location of the aircraft is the following, and it makes and asks for it.

[0028] The SSR reply signal from the aircraft to the SSR question signal of the transceiver station 1 has a certain time difference, and is received in the transceiver station 1 and a receiving station 2. At this time, a hyperbola as shown in the sign 51 of drawing 5 can be drawn according to that time difference. Moreover, as mentioned above, since the beam direction of the transceiver office 1 is known in immobilization, it can draw one straight line as shown in the beam direction at the sign 52 of drawing 5 . The processing section 33 makes the location of the aircraft an intersection with the straight line 52 which shows this hyperbola 51 and beam direction. Moreover, the location of the aircraft may be determined by the following approaches.

[0029] Drawing 6 is an enlarged drawing near monitor area E of drawing 2 . distance SL detached building ****** from the point in which the transceiver office 1 was installed for the aircraft by the positional information of the aircraft in Target date f now sent from the transceiver office 1 -- when things become clear, the line of position as shown in the broken line 61 of drawing 6 which has a radius SL centering on the transceiver office 1 can be drawn. Moreover, the hyperbola 62 shown as the hyperbola of drawing 5 and the continuous line of the same drawing 6 can be drawn according to the time difference mentioned above. The processing section 33 recognizes the intersection of these two lines 61 and 62 on the monitor area E to be the location of the aircraft.

[0030] Now, if the location of the aircraft is determined as mentioned above, the processing section 33 shown in drawing 1 will take the location of the aircraft and correlation which the aircraft positional information from ASDE4 shows, and will give an identification number to the location of the aircraft detected by ASDE4. That is, the identification number by the Target date determined as the location nearest to the location is given to the aircraft of the location detected by ASDE4. And the location of the aircraft by which the identification number was given in this way is displayed on a display 34. It is possible to make the radar scope of ASDE4 serve a double purpose as a display 34, and the character string which shows the symbol which shows the

location of the aircraft, and its identification number is displayed.

[0031] Drawing 7 shows the example of arrangement which installed two or more groups of the transceiver office 1 and a receiving station 2 in the airport side. Each group is arranged so that the location (the inlet port of a RWY, an outlet, the inlet port of a TWY, and Hitoshi Deguchi) through which the aircraft surely passes in an airport may serve as monitor area. The Target date from the group of these plurality is sent to the processing office 3 of drawing 1 , and is processed.

[0032] In addition, in the above example, the receiving station 2 was installed independently [the transceiver station 1]. However, although location detection precision falls, since it can detect the near location of the aircraft by which at least transceiver office 1 exists in monitor area theoretically, the example which omitted the receiving station 2 is also considered so that clearly [explanation of drawing 6].

[0033]

[Effect of the Invention] Autonomous detection is attained even if there is no message by the electric wave from the aircraft etc., since not only the aircraft that arrived at the airport according to this invention but the identification number of the aircraft which is going to take off from now on could be acquired as explained above, and SSR is used. Furthermore, since one set of a transceiver office is fundamentally sufficient per monitor area, low cost-ization is realizable.

CLAIMS

[Claim(s)]

[Claim 1] In the airport side aircraft discernment method which detects and displays the location and identification number of the aircraft which exist in an airport side The airport side detection radar installation which detects the location of the aircraft which exists in an airport side, The beam of the antenna unit which has directivity in an airport side towards the monitor area set up beforehand is fixed. The information about the location of the aircraft and its identification number are detected from the SSR reply signal which transmitted the SSR question signal periodically and was received on the predetermined time band according to the distance of the local station after this transmission, and monitor area. Correlation processing with the location which the information about the location of the aircraft contained in the Target date outputted

from the transceiver station which outputs the Target date containing them, and this transceiver station shows, and the location of the aircraft detected with said airport side detection radar installation is performed. The airport side aircraft discernment method characterized by having the processing station which gives the identification number in said Target date to the aircraft of the location detected with said airport side detection radar installation, and is displayed on a display.

[Claim 2] In the airport side aircraft discernment method which displays the location and identification number of the aircraft which exist in an airport side The airport side detection radar installation which detects the location of the aircraft which exists in an airport side, The beam of the antenna unit which has directivity in an airport side towards the monitor area set up beforehand is fixed. The information about the location of the aircraft and its identification number are detected from the SSR reply signal which transmitted the SSR question signal periodically and was received on the predetermined time band according to the distance of the local station after this transmission, and monitor area. The beam of the transceiver station which outputs the Target date containing them, and the antenna unit which has directivity towards said monitor area is fixed. The information about the location of the aircraft and its identification number are detected from the SSR reply signal received on the predetermined time band according to the distance of the local station after transmission of the SSR question signal of said transceiver station, and monitor area. The location of the aircraft is determined with a still more sufficient precision from the information about the location of the aircraft in the Target date containing the same identification number outputted from the receiving station which outputs the Target date containing them, and said transceiver station and said receiving station. Correlation processing with the determined this location and the location of the aircraft detected with said airport side detection radar installation is performed. The airport side aircraft discernment method characterized by having the processing station which gives the identification number in said Target date to the aircraft of the location detected with said airport side detection radar installation, and is displayed on a display.

[Claim 3] The airport side aircraft discernment method according to claim 2 which said transceiver station and said receiving station are arranged, and becomes so that the beam of the antenna unit of said transceiver station and the beam of the antenna unit of said receiving station may intersect perpendicularly mostly on monitor area.

[Claim 4] The airport side aircraft discernment method according to claim 1, 2, or 3 characterized by aircrafts, such as an inlet port of a RWY or a TWY and an outlet, making monitor area the location through which it surely passes.